



**UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY**
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

MEMORANDUM

October 6, 2020

Subject: Technical Screen for 83019-L HE 4005 Antimicrobial

PC Code(s): 107403	DP Barcode(s)/No(s): 457586
Decision No.: 560373	Registration Number (s): 83019-L
Regulatory Action: Technical Screen	CAS No(s): 199111-50-7
MRID: 49788401	Submission No.: 1046905

From: Judy Facey, Ph.D., Risk Assessment Process Leader JUDY FACEY Digitally signed by JUDY FACEY
Andrew Byro, Ph.D., Risk Assessment Process Leader ANDREW BYRO Digitally signed by ANDREW BYRO
Risk Assessment Science Support Branch (RASSB)
Antimicrobials Division (AD) (7510P)

Thru: Melissa Panger, Ph.D., Branch Chief Digitally signed by
Risk Assessment Science Support Branch (RASSB) MELISSA PANGER
Antimicrobials Division (AD) (7510P) Date: 2020.10.06
08:56:11 -04'00'

To: Tara Flint, Product Manager
John Hebert, Branch Chief
Regulatory Management Branch I
Antimicrobials Division (7510P)

The Agency has conducted a technical screen for the proposed new chemical 3-(trihydroxysilyl) propyldimethyloctadecyl ammonium chloride, tradename HE 4005 Antimicrobial (EPA Reg. No. 83019-L) by GELEST BIOSYSTEMS, LLC. This product is intended for use in food contact coatings, films and laminates. It is also proposed to be formulated into products such as appliances and equipment, barrier fabrics, building materials and components, collection and storage equipment (such as conveyor belts, piping systems, silos, tanks and process vessels), cookware, countertops, food wrap (including coated deli paper, coated meat interleavers and plastic wrap), general purpose containers, glazing for cement tile, glazing for vitreous china used in plumbing fixtures (such as sinks and countertops), industrial equipment, natural and synthetic fibers and fabrics, packaging, paper products (such as wipes, tissues, wall coverings, towels), plastic film, and sinks. There is a maximum concentration of 1% active (by weight) of the resin, laminate, or coating.

HE 4005 Antimicrobial is also proposed to be applied to or incorporated into manufactured products listed below for use in industrial, institutional, commercial or residential locations for non-food contact uses. These products include: Plastics, fiberglass, metals, glass, wood, ceramics, stone, natural materials, composites: Including air filters for furnaces, air conditioners, air purification devices, automobiles, and recirculating air handling systems; aquarium filters; automotive and vehicular parts; roofing materials (tiles, shakes, shingles, granules, stone, membranes, felt, underlayment and synthetic overcoats); building materials and components (including siding, wallboard, wood and wood composites, insulation and non-food contact cabinetry); ceiling tiles; concrete products; paints and coatings, thin films, mastics and sealants, cementitious materials (including caulk, grout and cement and grout premixes non-food contact conveyor and humidifier belts; non-food contact countertops; fiberglass ductboard for air handling systems; floor covering; flooring; general purpose (non-food contact) containers; furniture; bathroom and non-food contact kitchen hardware; mats; plumbing supplies and fixtures; sheet and formed glass. Fibers, fabrics (natural and synthetic, woven and non-woven), leather and household materials (natural and synthetic): Including buffer pads (abrasive and polishing); mattress cover pads, filling and ticking; pillow covers; sheets; blankets; bedspreads; fiberfill for upholstery, apparel, recreational gear, quilts and pillows; curtains; draperies; carpet and carpet underlay; rugs; upholstery; towels; shower curtains; toilet tank and seat covers; wall covering fabrics and wallpaper (including vinyl) for non-food contact surfaces; umbrellas; fire hose fabric; non-woven disposable diapers; wiping cloths; pre-moistened towelettes.

The proposed product label (dated 05/02/19) is attached at the end of this memorandum. The purpose of this technical screen is to determine whether the label and other information submitted with the application are sufficient to allow the assessment of human toxicology, occupational and residential exposure, ecological toxicity, and environmental fate as enumerated in 40 C.F.R. part 158 subpart W.

The application as submitted **fails** the technical screen in that the registrant did not properly cite how it plans to address the required mammalian (subchronic, chronic, developmental and reproduction, mutagenicity and immunotoxicity) studies, occupational and residential data and ecological fate and effects data. The Agency note that this product is similar to the registered HM 4005 antimicrobial product (EPA Reg. 83019-3). If the registrant submits the required data matrix used to satisfied the required data for HM 4005 antimicrobial the product all mammalian toxicology, occupational and residential exposure, and ecological fate and effects data will be satisfied, and the tech screen will pass.

Mammalian Toxicology (Fails the Screen)

The registrant has cited various mammalian toxicology data and Agency Waivers for the mammalian data in support of the proposed uses of the product. The following data were cited by the registrant:

Table 1. Mammalian Toxicology data Required for the Proposed Uses of 83019-L HE 4005 Antimicrobial

Toxicology Data Requirements		GELEST BIOSYSTEMS, LLC Citations
870.1100	Acute Oral Toxicity: Rat	47984101
870.1200	Acute Dermal Toxicity	47984102
870.1300	Acute Inhalation Toxicity: Rat	47984103
870.2400	Primary Eye Irritation: Rabbit	47984104
870.2500	Primary Dermal Irritation	47984105
870.2600	Dermal Sensitization	46921202
870.2600	Acute Neurotoxicity	N.R.
870.3100	90-Day Oral Toxicity: Rodent	MISSING
870.3150	90-Day Oral Toxicity: Nonrodent	N.R.
870.3250	21/28-Day Dermal Toxicity	N.R.
870.3250	90-Day Dermal Toxicity	N.R.
870.3465	90-Day Inhalation Toxicity: Rat	N.R.
870.6200	90-Day Neurotoxicity: Rat	N.R.
870.4100	Chronic Oral Toxicity: Rodent	N.R.
870.4200	Carcinogenicity: Rat and Mouse	N.R.
870.3700	Prenatal Developmental Toxicity: Rat and Rabbit	MISSING
870.3800	Reproduction and Fertility Effects	MISSING
870.6300	Developmental neurotoxicity	N.R.
870.5100	Reverse Mutation Assay	MISSING
870.5300	In Vitro Mammalian Gene Mutation	MISSING
870.5375	In Vitro Cytogenetics	MISSING
870.5385		
870.5395		
870.7485	Metabolism and pharmacokinetics	N.R.
870.7200	Companion animal safety	N.R.
870.7600	Dermal penetration	N.R.
870.7800	Immunotoxicity	MISSING

N.R. is not required by the 158 W guidelines.

The registrant did not cite data/or made waiver requests for majority of the toxicology data requirements. The submission fails the screen for mammalian toxicology.

Occupational and Residential Exposure (Fails the Screen)

The registrant did not cite occupational and residential exposure data in support of the proposed uses of the product.

Table 2. Occupational and Residential Exposure Data Required for the Proposed Uses of 83019-L HE 4005 Antimicrobial

Occupational and Residential Exposure Data Requirements		GELEST BIOSYSTEMS, LLC Citations
875.1100	Dermal outdoor exposure	MISSING
875.1200	Dermal indoor exposure	MISSING
875.1300	Inhalation outdoor exposure	MISSING
875.1400	Inhalation indoor exposure	MISSING
875.1500	Biological Monitoring	N.R.
875.1600	Data reporting	MISSING
875.1700	Product use information	See label
875.2100	Dislodgeable foliar residue and turf transferable residues	N.A.
875.2200	Soil residue dissipation	N.A.
875.2300	Indoor surface residue dissipation	N.R.
875.2400	Dermal exposure	N.R.
875.2500	Inhalation exposure	N.R.
875.2600	Biological monitoring	N.R.
875.2700	Product use information	See label
875.2800	Description of human activity	MISSING

Occupational and Residential Exposure Data Requirements		GELEST BIOSYSTEMS, LLC Citations
875.2900	Data reporting and calculations	MISSING

N.R. is not required by the 158 W guidelines.

N.A. "Not Applicable"

The registrant did not cite data for the occupational and residential exposure data requirements. The submission fails the screen for occupational and residential exposure.

Ecological Fate and Effects (Fails the Screen)

The registrant did not cite ecological effects data for fate and effects in support of the proposed uses of the product.

Table 3. Ecological Effects Data Required for the Proposed Uses of 83019-L HE 4005 Antimicrobial

Ecological Effects Data Requirements Mentioned in the Data Matrix		GELEST BIOSYSTEMS, LLC Citations
850.1010	Acute freshwater invertebrate toxicity	MISSING
850.1075	Acute freshwater fish toxicity	MISSING
850.1025/1035/1045/1055	Acute estuarine and marine organisms toxicity	C.R.
850.1300	Aquatic invertebrate life-cycle (freshwater)	MISSING
850.1350	Aquatic invertebrate life-cycle (saltwater)	C.R.
850.1400	Fish early life stage (freshwater)	MISSING
850.1500	Fish life cycle	C.R..
850.1710/1730	Aquatic organisms, bioavailability, biomagnification, toxicity tests	C.R..
850.1735	Whole sediment: acute freshwater invertebrates	C.R.
850.1740	Whole sediment: acute marine invertebrates	C.R..
850.1850/1950	Simulated or actual field testing for aquatic organisms	C.R.
850.2100	Acute avian oral toxicity	MISSING
850.2200	Avian dietary toxicity	C.R.
850.2300	Avian reproduction	C.R.
850.3020	Honey bee acute contact toxicity	MISSING
850.3030	Toxicity of residues to honeybees	MISSING.
850.4225	Seedling emergence, Tier II	C.R.
850.4250	Vegetative vigor, Tier II	C.R.
850.4300	Terrestrial field	C.R.
850.4400	Aquatic plant growth (aquatic vascular plant), Tier II	MISSING
850.4450	Aquatic field	C.R.
850.5400	Aquatic plant growth (algal), Tier II	MISSING

C.R. "Conditionally Required"

Table 4. Environmental Fate Data Required for the Proposed Uses of 83019-L HE 4005 Antimicrobial

Environmental Fate Data Requirements Mentioned in the Data Matrix		GELEST BIOSYSTEMS, LLC Citations
835.1110	Activated sludge sorption isotherm	C.R.
835.1230/1240	Leaching and adsorption/desorption	MISSING
835.2120	Hydrolysis	MISSING
835.2240	Photodegradation in water	MISSING
835.2410	Photodegradation in soil	MISSING
835.3110	Ready biodegradability	C.R.
835.3220	Porous pot study	C.R.

Environmental Fate Data Requirements Mentioned in the Data Matrix		GELEST BIOSYSTEMS, LLC Citations
835.3240	Simulation test - aerobic sewage treatment: A. Activated sludge units	C.R.
835.3280	Simulation tests to assess biodegradability of chemicals discharged to wastewater	C.R.
835.4100	Aerobic soil metabolism	MISSING
835.4200	Anaerobic soil metabolism	MISSING
835.4300	Aerobic aquatic metabolism	MISSING
835.4400	Anaerobic aquatic metabolism	MISSING
835.6200	Aquatic (sediment)	C.R.
None	Monitoring of representative U.S. waters	N.A.
None	Special leaching	C.R.
850.6800	Activated sludge respiration inhibition test OECD 209	MISSING

N.A. "Not Applicable"

C.R. "Conditionally Required"

The registrant did not cite ecological effects data for fate and effects in support of the proposed uses of the product. Because of this, the submission **fails** the screen for fate and effects data.

References:

US EPA (2019). HE 4005 Antimicrobial Product Label. DP457586. Signed 5/19/2020.

US EPA (2020). HE 4005 Antimicrobial Data Matrix with Submitter List Confidential. DP457586. Signed Feb 6, 2020.

HE 4005 Antimicrobial

A SILANE QUATERNARY AMMONIUM SALT

For use as an antimicrobial preservative under EPA and FDA Regulations to preserve finished food contact articles* (Food Preparation Surfaces, Polymeric Tubing for Beverages, Activated Carbon Water Filters) subject to FDA Regulations.

EPA Reg. No. 83019-X EPA Est. 83019-PA-001

ACTIVE INGREDIENT: 3-(trihydroxsilyl) propyldimethyloctadecyl ammonium chloride...	5.0%
INERT INGREDIENTS	95.0%
TOTAL	100.0%

KEEP OUT OF REACH OF CHILDREN

WARNING

FIRST AID	
Have product container or label with you when calling Poison Control Center or doctor, or going for treatment.	
If in eyes:	<ul style="list-style-type: none">Hold eye open and rinse slowly and gently with water for 15-20 minutes.Remove contact lenses, if present, after first 5 minutes, and then continue rinsing.Call a Poison Control Center or doctor for treatment advice.

PRECAUTIONARY STATEMENTS

HAZARD TO HUMANS AND DOMESTIC ANIMALS.

WARNING: CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY. Do not get in eyes or on clothing. Wear appropriate protective eyewear such as goggles, face shield, or safety glasses. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.

PRODUCT FEATURES AND BENEFITS

HE 4005 Antimicrobial imparts durable biostatic activity to the surface of a wide variety of substrates. HE 4005 Antimicrobial is effective against mold, mildew and algae as a static agent. Increased efficiency – through proper application, durable bacteriostatic, fungistatic and algistatic surfaces can be attained with a minimum amount of HE 4005 Antimicrobial. Provides freshness and combats deterioration and discoloration caused by bacteria, fungi and algae.

LOT NO. _____ NET CONTENTS _____



GELEST BIOSYSTEMS, LLC
11 East Steel Road, Morrisville, PA 19067

215-547-1015

MADE IN U.S.A.

PRECAUTIONARY STATEMENTS

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

Every effort should be made to contain accidental spills of powder to the immediate area. Many spills may be cleaned up alone or with sand or absorbent materials by sweeping and collection in a waste bin. The material may then be disposed of by incineration or landfill.

Inactivation of solutions containing HE 4005 Antimicrobial may be accomplished by addition of an anionic surfactant, or detergent in quantity equivalent to that of HE 4005 Antimicrobial in solution.

DIRECTIONS FOR USE:

It is a violation of Federal Law to use this product in a manner inconsistent with its label.

FOR USE AS AN ANTIMICROBIAL UNDER EPA REGULATIONS

FOR COMMERCIAL APPLICATIONS IN HOMES, OFFICES, AUTOMOBILES AND INSTITUTIONS AND FOR INDUSTRIAL USE ONLY, This product is registered as a microbiostatic agent for material preservation; neither this product nor the articles treated with this product may state or imply any public health claims. Articles or substances treated with this product will be exempt from FIFRA regulation pursuant to 40 CFR 152.25(a) if the intended use for incorporating this material into a treated article or substance is for the protection of the article or substance itself.

APPROVED USES: HE 4005 Antimicrobial may be applied to or incorporated into manufactured products listed below for use in industrial, institutional, commercial or residential locations for non-food contact uses

Plastics, fiberglass, metals, glass, wood, ceramics, stone, natural materials, composites: Including air filters for furnaces, air conditioners, air purification devices, automobiles, and recirculating air handling systems; aquarium filters; automotive and vehicular parts; roofing materials (tiles, shakes, shingles, granules, stone, membranes, felt, underlayment and synthetic overcoats); building materials and components (including siding, wallboard, wood and wood composites, insulation and non-food contact cabinetry); ceiling tiles; concrete products; paints and coatings, thin films, mastics and sealants, cementitious materials (including caulk, grout and cement and grout premixes non-food contact conveyor and humidifier belts; non-food contact countertops; fiberglass ductboard for air handling systems; floor covering; flooring; general purpose (non-food contact) containers; furniture; bathroom and non-food contact kitchen hardware; mats; plumbing supplies and fixtures; sheet and formed glass.

Fibers, fabrics (natural and synthetic, woven and non-woven), leather and household materials (natural and synthetic): Including buffer pads (abrasive and polishing); mattress cover pads, filling and ticking; pillow covers; sheets; blankets; bedspreads; fiberfill for upholstery, apparel, recreational gear, quilts and pillows; curtains; draperies; carpet and carpet underlay; rugs; upholstery; towels; shower curtains; toilet tank and seat covers; wall covering fabrics and wallpaper (including vinyl) for non-food contact surfaces; umbrellas; fire hose fabric; non-woven disposable diapers; wiping cloths; pre-moistened towelettes

and tissue wipes (these do not impart pesticidal properties); apparel including outerwear, sportswear, sleepwear, socks, hosiery, undergarments, gloves and uniforms; footwear (boots, shoes and components); sports equipment and athletic gear; cloth for sails, ropes, tents and other outdoor equipment; sand bags; tarps; awnings; book covers; pictures.

HOW TO USE:

MSDS INFORMATION: BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET CAN BE OBTAINED BY WRITING TO GELEST OR BY CALLING (215) 547-1015. A MATERIAL SAFETY DATA SHEET FOR A TYPICAL USE DILUTION AQUEOUS SOLUTION IS ALSO AVAILABLE.

Wear goggles or face shield, protective clothing, and rubber gloves when handling the material. Use with proper ventilation.

HE 4005 Antimicrobial can be incorporated into or applied onto organic and inorganic substrates. HE 4005 Antimicrobial can be used to give a treatment 0.01 to 1.0 percent by weight of active ingredients. HE 4005 Antimicrobial is a ready to use formulation and in most cases can be used as is without dilution. However, aqueous solutions of lower concentrations can be prepared for surface treatment by simply adding HE 4005 Antimicrobial to water with stirring. NOTICE: Poor agitation when adding this silane to water can result in locally high concentrations. This process can be sped up by adequate stirring of the mixture. Surfaces can be treated with the aqueous solution by brushing, dipping, padding, soaking, spraying or fogging until adequately wet or applying by foaming techniques. After applying treatment, the surface should be allowed to dry at temperatures from ambient to a maximum of 160°C (320° F) to effect complete curing of silanol groups and to remove water or solvents. Curing of HE 4005 Antimicrobial may be accelerated or enhanced with heat or catalysis. For each application, determine optimum application and drying conditions, such as time and temperature before use. If desired, reapply HE 4005 Antimicrobial if odor, staining and discoloration due to bacteria, mold or mildew occur.

Incorporate HE4005 Antimicrobial directly into formulations used to make end-use products, or dilute with water or alcohol and then apply it to the organic and inorganic surfaces to give 0.01 to 1.0 percent by weight of active ingredient.

*FOR USE AS AN ANTIMICROBIAL TO PRESERVE FINISHED FOOD CONTACT ARTICLES SUBJECT TO FDA REGULATIONS

Incorporate HE 4005 Antimicrobial as an antimicrobial additive at or below the indicated maximum concentration into the polymeric manufactured products listed below that are used for manufacturing, packing, packaging, transporting, handling and/or holding food if such use is not intended to have any antimicrobial effect in the food itself. Do not incorporate HE 4005 Antimicrobial into any food or drinking water contact application listed on this label unless the substance is approved, with associated use conditions, for food contact in 21 CFR 174-186 (inclusive) as amended, or in the United States Food and Drug Administration’s Food Contact Substance Notification System, as amended.

This Food Contact Substance (FCS) can be used as an additive without food type or temperature limitation in food preparation surfaces (where the FCS is either incorporated into the resin, a food contact laminated layer, or applied to the surface as part of a coating). The FCS may be used at a maximum use level of 1 active weight percent of the resin, laminate, or coating.

Use: Food contact coatings, films and laminates

Products: Appliances and equipment, barrier fabrics, building materials and components, collection and storage equipment (such as conveyor belts, piping systems, silos, tanks and process vessels), cookware, countertops, food wrap (including coated deli paper, coated meat interleavers and plastic wrap), general purpose containers, glazing for cement tile, glazing for vitreous china used in plumbing fixtures (such as sinks and countertops), industrial equipment, natural and synthetic fibers and fabrics, packaging, paper products (such as wipes, tissues, wall coverings, towels), plastic film, sinks

Maximum Concentration: 1% active weight percent of the resin, laminate, or coating.

Polymeric tubing for the transfer of beverages. The FCS may be used at a maximum use level of 1 active percent of the finished tubing.

Use: Food contact molded plastic parts

Products: Beverage dispensing equipment tubing, beverage processing equipment tubing

Maximum Concentration: 1% active weight percent of the finished tubing

Repeat use activated carbon water filters. The FCS may be used at a maximum use level of 0.25 active weight percent of the carbon block.

Use: Water filter

Products: Activated carbon water filters

Maximum Concentration: 0.25% active weight percent of the carbon block

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

STORAGE: Store in original, tightly closed container in an area inaccessible to children and away from food or feed. HE 4005 Antimicrobial is moisture sensitive. Keep tightly closed until ready to use. Reclose tightly after each use. Store in original, unopened containers at or below 25°C (77°F).

PESTICIDE DISPOSAL: Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Non-Refillable Metal Container-Nonrefillable container. Do not reuse or refill this container. Triple rinse (or equivalent). Then offer for recycling if available or reconditioning if appropriate or puncture and dispose in sanitary landfill, or by other procedures approved by state or local authorities. **Non-Refillable Plastic Containers-**Nonrefillable container. Do not reuse or refill this container. Triple rinse (or equivalent). Then offer for recycling if available or reconditioning if appropriate or puncture and dispose in sanitary landfill, or if allowed by state or local authorities, by burning. If burned, stay out of smoke. **Non-Refillable Glass Containers-**Non-refillable container. Do not reuse or refill this container. Triple rinse (or equivalent). Then offer for recycling if available or dispose in a sanitary landfill, or by procedures approved by state and local authorities.

NOTICE: GELEST BIOSYSTEMS, LLC warrants that the product conforms to its chemical description and is reasonably fit for the purposes stated in the labeling when used in accordance with directions under normal conditions of use; but this warranty of fitness for a particular purpose does not extend to the use of this product contrary to written instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use. **GELEST BIOSYSTEMS, LLC SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING THE WARRANTY OF MERCHANTABILITY.**

{Abbreviated Label for 100-gram size}

HM 4005 Antimicrobial

EPA Reg. No. 83019-3

EPA Est. 83019-PA-001

ACTIVE INGREDIENT: 3-(trihydroxysilyl)

propyldimethyloctadecyl ammonium

chloride.....5.0%

INERT INGREDIENTS:95.0%

TOTAL:100.0%

KEEP OUT OF REACH OF
CHILDREN

WARNING

Lot No: _____ Net Contents: _____

**Please see enclosed sheet for full
label information.**

GELEST BIOSYSTEMS, LLC

11 East Steel Road, Morrisville, PA 19067

215-547-1015 CHEMTREC: 800-424-9300

FIRST AID

Have product container or label with you when calling Poison Control Center or doctor or going for treatment.

If in eyes:

-Hold eye open and rinse slowly and gently with water for 15-20 minutes.

-Remove contact lenses, if present, after first 5 minutes, and then continue rinsing.

-Call a Poison Control Center or doctor for treatment advice.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

WARNING: CAUSES SUBSTANTIAL, BUT TEMPORARY EYE INJURY. Do not get in eyes or on clothing. Wear appropriate protective eyewear such as goggles, face shield, or safety glasses.

Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before use.

8/8/2017